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ASPECTS OF CARIBOU BIOLOGY IN THE VICINITY OF KLUANE NATIONAL PARK

by

S. Oosenbrug

Progress Report - Field Season #1, 1973.

THE ARCTIC INSTITUTE OF NORTH ~~AMERICA~~ ^{FEB 5 1975}



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Montreal

January 28/75

Dear Mrs. Cooke,

Enclosed is last summer's progress report of caribou research in the vicinity of Kluane Park. I am presently working on the thesis regarding these caribou, and this will not be finished until later this year. Other miscellaneous reports on caribou distribution and movements are also being prepared at the present. I will send copies of these as soon as they are completed.

Thank you for your interest.

Sincerely,

S. Osenberg.

aka AINA Survey Northern Research.

Aspects of Caribou Biology in the Vicinity of Kluane National Park

Introduction

During the summer of 1973, research was undertaken to determine the range relationships, population structure and taxonomy of a herd of caribou living on the Burwash Uplands, adjacent to Kluane National Park, Yukon Territory. It was felt that these caribou belong to the subspecies Rangifer tarandus Osborni, a localized race restricted to mountain regions in northern British Columbia, and the Yukon Territory. This study would add to the present limited knowledge of the biology of Osborn caribou. Eventually, by assessing range requirements, herd composition and movements and habitat disturbance, it would provide a possible basis for land-use policies for the region.

Field work was carried out by S. Oosenbrug from May 25 to August 3. Base support and aerial search time was provided by the Arctic Institute of North America through a base camp located on Kluane Lake, 50 miles south-east of the study area.

The study area (Burwash Uplands) was defined as an area of approximately 500 square miles, bordered by the Donjek River on the west, the Alaska Highway on the north, Halfbreed Creek on the east, and the present Kluane National Park boundary on the south.

Field Work - Summer, 1973.

The first summer's field work consisted of:

- 1) A preliminary assessment of the caribou range. This included describing the vegetation therein through mapping plant communities, sampling vegetation, and compiling a plant species list.
- 2) Ground and aerial searches to determine the summer distribution, abundance, movements, and population structure of caribou on the study area.
- 3) The collection of weather data, recorded on the study area, and at nearby stations (Burwash Landing, Kluane Lake, Whitehorse) for comparison.
- 4) Antler, skull, and jaw measurements of caribou remains to aid in taxonomy and suggest possible mortality factors.
- 5) The collection of caribou feces for possible analysis to indicate food preferences, and collection and examination of wolf scats to determine prey species.
- 6) A preliminary assessment of human impact on the caribou habitat, caribou movements and behaviour, as determined by observations.

Preliminary Results

Floral description of the study area

The study area was divided into three broad vegetation-altitude zones:

- 1) Forest zone - below 4000 feet
- 2) Sub-alpine zone - 4000 feet to 5000 feet
- 3) Alpine zone - above 5000 feet

Each of these zones possessed a number of plant associations, or sub-habitats, determined by degree and direction of slope, drainage, and specific altitude (Table 1, Figure 1).

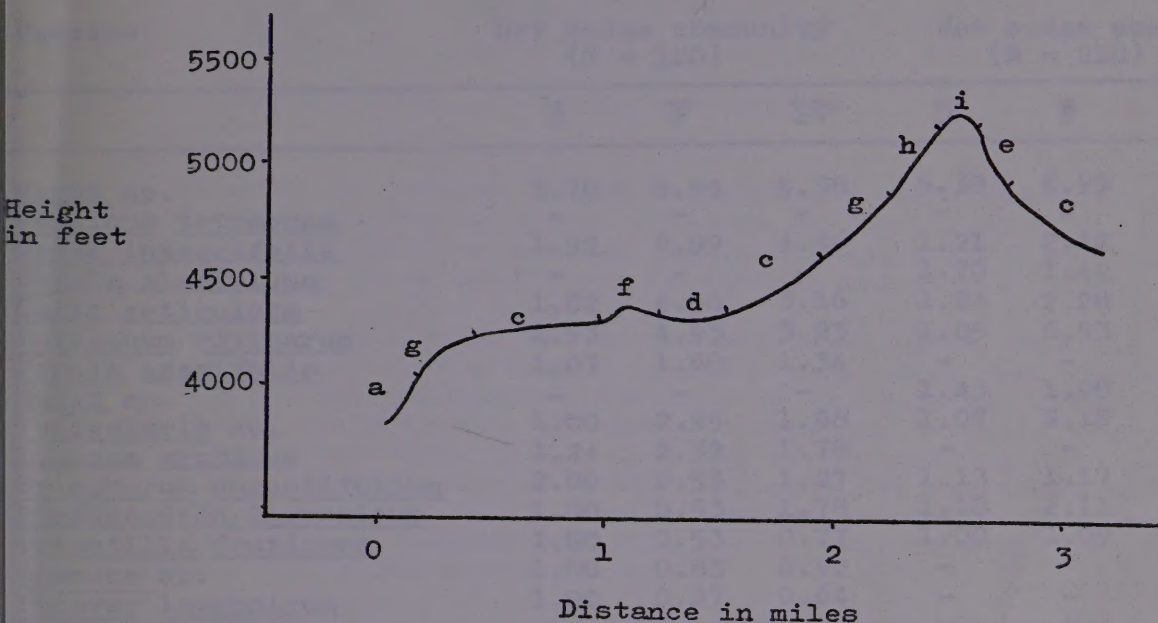
Table 1. Vegetation Communities on the Burwash Uplands, Yukon.

Zone	Vegetation Community	Site Description
1	a Willow-spruce	North slopes and lowland areas
	b Riparian willow	Gravel creek bottomland
2	b Riparian willow	
	c Sedge-birch	Dominant on flat areas
	d Wet sedge	Poorly-drained depressions
	e Dry willow-grasses	Steep, well-drained south slopes
	f Willow-birch	Elevated, well-drained sites
	g Dry sedge	Gentle north slopes below bell-heather; dominant on higher NE, E. and SE slopes
	h Bell-heather	Steep north slopes
3	g Dry sedge	
	h Bell-heather	
	i <u>Dryas</u>	Exposed, well-drained hilltops

Communities were sampled for density and frequency of possible forage species, using a technique similar to that described by Bliss (1966) for alpine plant associations.

Six (1.0 x 0.5 metre) plots were selected at random along each of five lines also selected at random along a base line of 15 metres. These sampling sites (30 plots) were located within representative plant communities throughout the study area. Species were rated for density (0-100% : 1-6) and frequency (percent of plots in which each species is represented).

Figure 1. Vegetation Profile of a Section of the Burwash Uplands, Yukon (transect from 61° 21'N, 139° 17'W to 61° 23'N, 139° 16'W).



Note: a-i represent vegetation communities described in Table 1.

During the summer four communities were sampled: dry sedge, wet sedge, sedge-birch and bell-heather. Calculations indicate the prominence value, or relative abundance of each plant species within communities where prominence value (PV) = density + frequency/2. (Table 2).

So far, sampling is incomplete. It needs to be extended to include all communities and sample size will have to be increased to determine significance levels. When complete, the sampling will provide an index of plant species composition throughout the study area. Together with observations of feeding caribou, analysis of sampling data will indicate the communities and forage species preferentially utilized by caribou.

Caribou numbers and distribution: Caribou numbers were calculated from ground and aerial searches. Thirty-nine days were spent traveling the study area on foot, while five intensive aerial searches (total eight hours) were made approximate every two weeks. The aerial searches provided a reasonably good indication of total caribou numbers, whereas ground searches enabled only an estimate. This is so because only part of the study area could be observed over a short time period; caribou could move and be counted twice, or be missed for the same reason.

Table 2. Preliminary estimate of relative abundance of plant species within four vegetation communities - Burwash Uplands, Yukon. July, 1973.

Species	Dry sedge community (N = 120)			Wet sedge community (N = 210)		
	D	F	PV	D	F	PV
<u>Carex</u> sp.	3.78	6.99	5.38	5.38	6.99	6.19
<u>Cassiope tetragona</u>	-	-	-	-	-	-
<u>Dryas integrifolia</u>	1.92	6.99	4.46	1.21	2.42	1.82
<u>Betula glandulosa</u>	-	-	-	1.70	1.42	1.56
<u>Salix reticulata</u>	1.82	4.50	3.16	1.24	2.28	1.76
<u>Polygonum viviparum</u>	1.53	4.93	3.23	1.05	0.93	0.99
<u>Pyrola asarifolia</u>	1.07	1.60	1.34	-	-	-
<u>Salix</u> sp.	-	-	-	1.43	1.90	1.67
<u>Pedicularis</u> sp.	1.00	2.95	1.98	1.07	2.15	1.11
<u>Lupinus arcticus</u>	1.24	2.32	1.78	-	-	-
<u>Eriophorum angustifolium</u>	2.00	0.53	1.27	1.13	1.17	1.15
<u>Rhododendron lapponicum</u>	1.00	0.53	1.78	1.18	2.11	1.70
<u>Potentilla fruticosa</u>	1.00	0.53	0.77	1.00	1.09	1.05
<u>Anemone</u> sp.	1.00	0.83	0.92	-	-	-
<u>Papaver lapponicum</u>	1.00	0.27	0.64	-	-	-
<u>Ledum palustre</u>	-	-	-	-	-	-
<u>Rumex arcticus</u>	-	-	-	-	-	-
Various mosses	2.44	6.58	4.51	1.49	1.50	1.50
Various grasses	2.00	0.53	1.27	-	-	-
Species	Sedge-birch Community (N = 300)			Bell-heather community (N = 30)		
	D	F	PV	D	F	PV
<u>Carex</u> sp.	3.71	6.88	5.30	1.83	5.88	3.86
<u>Cassiope tetragona</u>	-	-	-	3.50	6.99	5.25
<u>Dryas integrifolia</u>	1.50	3.41	2.46	1.72	4.87	3.30
<u>Betula glandulosa</u>	2.37	5.28	3.83	-	-	-
<u>Salix reticulata</u>	1.78	5.72	3.75	1.60	4.87	3.30
<u>Polygonum viviparum</u>	1.46	3.45	2.46	1.09	4.57	2.83
<u>Pyrola asarifolia</u>	1.05	3.55	2.30	1.13	4.73	2.93
<u>Salix</u> sp.	1.67	2.41	2.04	1.00	0.20	0.60
<u>Pedicularis</u> sp.	1.44	2.99	2.22	-	-	-
<u>Lupinus arcticus</u>	1.37	1.20	1.29	1.33	3.06	2.20
<u>Eriophorum angustifolium</u>	1.95	2.41	2.19	-	-	-
<u>Rhododendron lapponicum</u>	1.40	0.86	1.13	1.00	0.20	0.60
<u>Potentilla fruticosa</u>	1.36	1.53	1.45	-	-	-
<u>Anemone</u> sp.	-	-	-	-	-	-
<u>Papaver lapponicum</u>	1.00	0.20	0.60	-	-	-
<u>Ledum palustre</u>	1.00	0.20	0.60	-	-	-
<u>Rumex arcticus</u>	-	-	-	1.00	0.20	0.60
Various mosses	2.60	6.23	5.52	3.86	5.52	4.60
Various grasses	1.36	1.28	1.32	-	-	-

Note: Density and frequency of plant species were scored as: 1=0-5.9%, 2=6-25.9%, 3=26-50.9%, 4=51-75.9%, 5=76-95.9%, 6=96-100%.
D = Density, F = Frequency, PV = Prominence Value (D+F/2)

Aerial searches revealed the following counts:

	<u>Total</u>	<u>Breakdown</u>
May 28	25	6f, 1m, 4c, 14?
June 6	22	22?
July 12	78	2m, 73?, 3c
July 23	79-89	77-87?, 1f, 1c
August 1	100-110	95-105?, 2f, 2c, 1m

Legend: f = female, m = male, c = calf, ? = unknown

Aerial searches on several occasions located a concentration of caribou outside of foot travel range. Because of the relatively large area involved, aerial searches were an invaluable means of censusing and locating caribou, which could then be further observed on foot.

At present the total range of the caribou found above treeline on Burwash Uplands during the summer is not known. They are thought to winter in the wooded valleys and lowlands of the Uplands, although this has not been substantiated. Summer observations indicate that caribou apparently congregate in the vicinity of Ampitheatre Mountain during mid-summer. More intensive aerial searches are necessary to establish whether the 50 or so additional caribou located in July were originally missed, or if immigration took place from areas outside the Burwash Uplands, i.e. - Wolverine Plateau.

Population Structure: Caribou were classified to sex and age whenever they could be approached closely enough for identification. Preliminary results suggest that the tundra of the Burwash Uplands is primarily a calving ground and the summer range of cows, calves and yearlings. Mature bulls were not located on the study area until early July, when several were observed with a herd of 70-80 animals, most of these being cows and yearlings.

Analysis of productivity data, i.e. - sex and age ratios, has not been done, but observations of a herd of 76 caribou in late June showed the presence of 12 calves, comprising 15.6% of the herd. Further observations are essential in assessing any changes in the population structure of the herd.

Although aerial searches by fixed-wing aircraft were useful in locating groups of caribou, the speed and large turning circle required of the aircraft made counting the animals extremely difficult and ageing and sexing them impossible. Accuracy in numbering and identification could be greatly increased if a helicopter was available, in addition to reducing stress to caribou as a result of several low passes.

Movements: Data on caribou movements were obtained by recording the location of groups over several days (daily movement) and over the entire field season (seasonal movement). From the data collected so far, it appears that the caribou gradually move to higher elevations toward summer (Table 3). Observations indicate that the animals began to

Table 3. Altitude location of caribou - Summer, 1973.

Date	Number of caribou			Maximum Daily Temperature
	below 4000 ft.	4000 to 5000 ft.	over 5000 ft.	
May 26		15		50 F.
27		22		58
28	9	16		45
June 2		2		50
6		22		52
8		22		44
9		15		45
10		22	3	54
11		3		54
14		14	16	57
15		10	20	50
16		6	28	54
18		30		54
19		40		57
17		1		52
23		76		59
July 1		5		59
2		22		64
12		4	78	-
16		3		64
19			2	54
23		5	75-85	68
25			5	66
26			42	74
27		11	25	70
28		10		64
29		8	1	64
30		1		60
Aug. 1		5	90-100	52

move out of the trees and creek valleys by late May. The cows moved into the sub-alpine areas to calve, and by late June gathered with yearlings into small bands. In July bulls began to join the bands on the higher slopes, and by midsummer these had congregated into a herd of 80-100 caribou in the vicinity of Amphitheatre Mountain.

Daily midsummer movements seemed to be in response to temperature and/or insects. During the hot weather in late July, most of the caribou were observed on high, exposed knolls and snow banks at the foot of Burwash Glacier. All caribou sighted at this time showed signs of insect harassment: head-shaking, bursts of running and jumping (gadding), or a motionless head-down stance. Periodic cooler weather, i.e. - snowfall, resulted in movements to lower regions. Complete, on-site meteorological data are needed to test this theory and indicate if other weather conditions may be related to caribou movements.

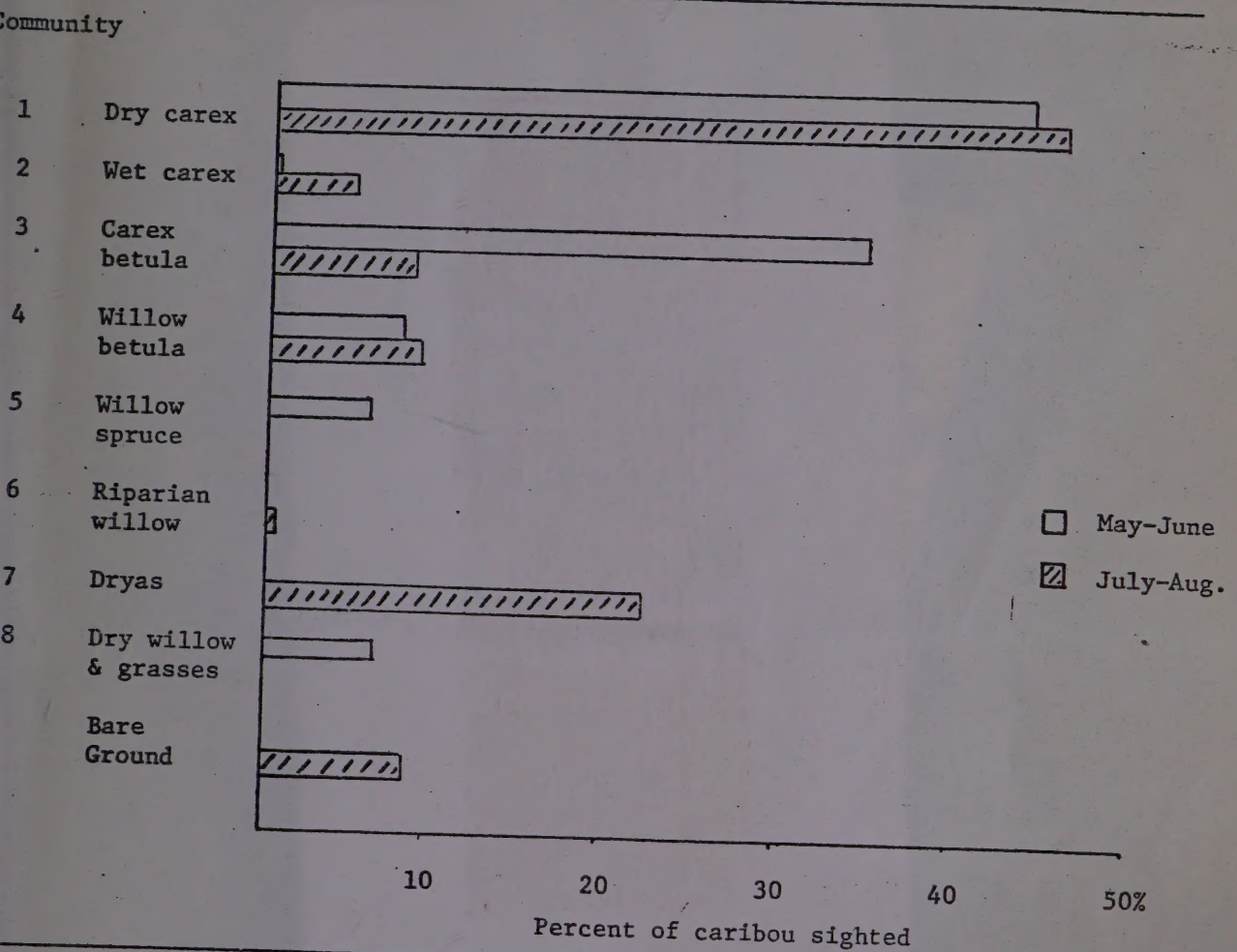
During the first field season, individual caribou movements could not be determined due to difficulties in distinguishing caribou. The tagging of animals in the spring when they are scattered and easier to approach would greatly assist in censusing caribou numbers and charting their movements.

Habitat selection: Each caribou sighting was assigned to a specific vegetation association to determine caribou habitat preference. Preliminary results indicate that the dry-sedge community forms the major habitat for caribou throughout the summer (Fig. 2). Caribou frequent the sub-alpine sedge-birch community in early summer, then move into the alpine Dryas community by midsummer. Additional information is required concerning habitat preference. Determining the frequency of pellet groups in vegetation communities will provide an index of caribou use.

Taxonomy: Caribou observed at close range were described as to sex, approximate age, shoulder height, estimated weight and antler development, as well as common characteristics. Six sets of antlers from mature bulls were located and their measurements recorded. Only one single male antler was found. These have not been compared to known Osborn caribou antlers. Observations tentatively suggest that the caribou on the Burwash Uplands are Osborn caribou, in that the inside of the hind legs are white, as described by Cowan and Guiguet (1965). Immobilizing caribou for tagging purposes would make possible accurate body and antler measurements essential to identification of the caribou.

Human Impact: All mining operations and access roads on the study area were located and mapped. Four quartz mining claims exist on the Uplands. Five placer mines were in operation at some time during the summer. These are restricted primarily to the lower creek valleys, areas not utilized by caribou during the summer. In June, an access trail to a placer operation was constructed over sub-alpine terrain, resulting in soil cover removal, and subsequent massive erosion after several days of heavy rain. At present it is not known how caribou react to habitat disturbance of this nature. Several observations suggest that the caribou are sensitive to continual harassment, i.e. - the noise and movement of vehicles, people, and when stressed will at times flee an extremely long distance. More information is needed to this extent.

Figure 2. Habitat preference of caribou on the Burwash Uplands.



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